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UNITED STATES PATENT APPLICATION

FOR

METHOD AND SYSTEM FOR MULTI-CARRIER VOICEMAIL CONTROL

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## RELATED U.S. APPLICATIONS

This application incorporates herein by reference, and claims priority to, the commonly-owned co-pending provisional patent application U.S. serial number 60/467,794, entitled "MULTI-MODE CONFERENCE CALL SETUP AND  
5 MANAGEMENT AND DATA BROWSING USER INTERFACE TECHNIQUE ('MULLET DATEBOOK') AND DYNAMIC SIZING USER INTERFACE TECHNIQUE FOR DATA DISPLAY AND TEXT-KEY CUSTOMIZATION FOR AUDIO MENU SELECTION," filed May 1, 2003, and assigned to the assignee of the present invention.

## 10 FIELD OF THE INVENTION

Embodiments of the present disclosure relate generally to portable computing systems. In particular, embodiments of the present disclosure relate to a method and system for multi-carrier voicemail control via a portable  
15 computing system.

## BACKGROUND OF THE INVENTION

The miniaturization of components used in the construction of computer  
20 systems has resulted in the emergence of new categories of computing devices. One such new category of computing device is the so called handheld computing systems. A handheld computer system is small enough to be held in the hand of a user and thus may be termed "hand sized". Handheld computing systems have traditionally been used in the performance of various computing operations such

as personal organization tasks, wireless e-mail receipt and transmission, note-taking, and electronic games.

An area that has not heretofore been affected by palmtop computing is  
5 voicemail navigation. Telephone transmission services or “carriers” generally provide voicemail services to their customers. The different voicemail services provided by the respective carriers present a variety of different schemes for user interaction and control. It should be appreciated that each carrier may have its own unique voicemail system that is controlled by its own unique DTMF (Dual  
10 Tone Multi Frequency) configurations. Differences are manifested in the different voicemail options that are represented by the keys assigned by the respective carriers for voicemail system navigation.

Conventionally, carriers provide a voicemail system with a menu tree that  
15 can be accessed via the typical prompt and press menu. For example, after listening to a message users are vocally prompted to by the voicemail system “save”, “erase” or “skip” the message by pressing a button or numeric key on a keypad. Beyond these normal commands there are hidden menus that offer “replay”, “date and time info”, “forward”, “callback” and “cancel” options all with  
20 specially assigned keys to invoke the actions. Consequently, a user must listen for vocal prompts in order to select a desired voicemail option. Alternatively, a user must have knowledge of hidden commands in order activate the voicemail functions that correspond to the hidden commands.

25 The problem with this approach is that it requires a user to memorize the particular key assignment the voicemail carrier assigns to the different functions. Also, if the user changes carriers, a new key assignment must be learned.

## SUMMARY OF THE INVENTION

Accordingly, a need exists for a method and system for a uniform multi-carrier voicemail control. The present invention provides a method and system that accomplishes this need.

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A computer implemented method of issuing commands to a remote system is disclosed. The method includes maintaining a plurality of translations in a memory, where each translation maintained is for translating between a common plurality of functions and custom signals for implementing the common plurality of functions on a respective remote system. The method further includes selecting a particular translation from among a plurality of translations for a particular remote system. In addition, the method includes displaying on-screen icons representing the common plurality of functions and responding to a selected on-screen icon associated with a selected common function. A selected on screen icon is responded to by obtaining a custom signal from a particular translation corresponding to the selected common function and issuing the custom signal to the particular remote system.

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Embodiments of the present invention also provide a device for issuing commands to a remote system. The device includes a memory for storing a plurality of translations, each translating between a common plurality of functions and custom signals for implementing the common plurality of functions on a respective remote system. In addition, the device includes a selector for selecting

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a particular translation of the plurality of translations for a particular remote system. Further included is a display screen for displaying on-screen icons representing the common plurality of functions wherein the on-screen icons comprise respective text corresponding to the common plurality of functions.

5 Moreover, the device includes a processor for responding to a selected on-screen icon associated with a selected common function, obtaining a custom signal from the particular translation corresponding to the selected common function and issuing the custom signal to the particular remote system.

10 In addition, embodiments of the present invention include a device for issuing commands to a voicemail system. The device includes a memory for storing a first translation between a common plurality of functions. The device also includes first custom signals for implementing said common plurality of functions on a first voicemail system, the first custom signals for causing  
15 voicemail navigation through the first voicemail system. In addition the device includes a display screen for displaying on-screen icons representing the common plurality of functions wherein the on-screen icons comprise respective text corresponding to the common plurality of functions. The device further includes a processor for responding to a selected on-screen icon associated with  
20 a selected common function, and for obtaining a custom signal from said first translation corresponding to said selected common function and issuing the custom signal to the first voicemail system.

In accordance with the embodiments of the present invention, an on-screen display is presented to a user having common voicemail navigation commands associated with keys on a keypad or other collection of buttons. Each button has a label indicating the associated function. When the user selects a label-button, the device automatically determines the appropriate DTMF signal associated with that function based on a translation particular to the users voicemail carrier. The signal is then transmitted to the remote voicemail system to implement the selected function. By using the translation, the user is freed of having to memorize the particular key function assignment of his/her carrier and the key labels also frees the user of requiring voicemail prompts to select the appropriate key.

These and other advantages of the present invention will no doubt become obvious to those of ordinary skill in the art after having read the following detailed description of the preferred embodiments which are illustrated in the drawing figures.

## BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and form a part of this specification, illustrate embodiments of the invention and, together with the  
5 description, serve to explain the principles of the invention.

Figure 1 shows a multi-carrier voicemail control system according to one embodiment of the present invention.

10 Figure 2 shows a generator/decoder application according to one embodiment of the present invention.

Figure 3 is a process flow diagram of the process according to one embodiment of the present invention.

15 Figure 4 shows steps in a process for multi-carrier voicemail control according to one embodiment of the present invention.

Figure 5 is a block diagram of an exemplary computer system in  
20 accordance with embodiments of the present invention.

Figure 6 is a data flow diagram of components of an intelligent wireless communication device in accordance with one embodiment of the present  
invention.

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## DETAILED DESCRIPTION OF THE INVENTION

In the following detailed description of the present invention, numerous specific details are set forth in order to provide a thorough understanding of the present invention. However, it will be obvious to one skilled in the art that the present invention may be practiced without these specific details. In other instances well known methods, procedures, components, and circuits have not been described in detail as not to unnecessarily obscure aspects of the present invention.

Some portions of the detailed descriptions which follow are presented in terms of procedures, logic blocks, processing, and other symbolic representations of operations on data bits within a computer memory. These descriptions and representations are the means used by those skilled in the data processing arts to most effectively convey the substance of their work to others skilled in the art. A procedure, logic block, process, etc., is here, and generally, conceived to be a self-consistent sequence of steps or instructions leading to a desired result. The steps are those requiring physical manipulations of physical quantities. Usually, though not necessarily, these quantities take the form of electrical or magnetic signals capable of being stored, transferred, combined, compared, and otherwise manipulated in a computer system. It has proven convenient at times, principally for reasons of common usage, to refer to these signals as bits, values, elements, symbols, characters, terms, numbers, or the like.

It should be borne in mind, however, that all of these and similar terms are to be associated with the appropriate physical quantities and are merely convenient labels applied to these quantities. Unless specifically stated otherwise as apparent



from the following discussions, it is appreciated that throughout the present invention, discussions utilizing terms such as "selecting" or "responding" or "displaying" or the like, refer to the action and processes of a computer system, or similar electronic computing device, that manipulates and transforms data represented as physical (electronic) quantities within the computer system's registers and memories into other data similarly represented as physical quantities within the computer system memories or registers or other such information storage, transmission or display devices.

## MULTI-CARRIER VOICEMAIL CONTROL SYSTEM

Figure 1 shows a multi-carrier voicemail control system 100A according to one embodiment of the present invention. The device may be portable and in one embodiment may be a portable telephone. In other embodiments a computer system or other computing device may be integrated therewith. Embodiments of the present invention provide a multi-carrier voicemail control system 100A that enables users to fully utilize the voicemail options provided by the voicemail systems of a plurality of different telephone service carriers. According to one embodiment, the multi-carrier voicemail control system facilitates the translation of locally generated signals into custom signals configured to activate common voicemail functions of the voicemail systems of a plurality of telephone service carriers. Figure 1 shows onscreen text-key button/functions 101 (e.g., on screen icons), specified carrier display 103, keypads 105, navigation resources 107 and system display 109. Figure 1 also shows voicemail system 100B that includes a display 109B that presents a truncated list of onscreen button/functions 101 provided by voicemail system 100A. According to Figure 1, the device 100 has a configurable screen that varies in size between a full display and a reduced in size display.

Onscreen button/functions 101 represent the voicemail options that are provided by the voicemail system of the carrier that is shown in carrier display 103. The onscreen button/functions 101 are presented on system display 109 and may be viewed by a user. These buttons have on-screen labels that correspond to voicemail functions. Keypads 105 and navigation resources 107 may facilitate other forms of control of a carriers voicemail system functions 101. The arrangement of buttons 101 may correspond to the arrangement of keys 105.

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It should be appreciated, that each carrier may provide a voicemail system with a menu tree that can be accessed via a typical prompt and press menu. For example after listening to a message users may be prompted to "Save", "Erase", or "Skip" the message by selecting (e.g., pressing button etc.) "X". Beyond these typical commands there may be hidden menu options that system users need to navigate such as "Replay", "Date and Time Information", "Forward", "Callback" and "Cancel".

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Embodiments of the present invention allow system users to navigate their specified carriers voicemail system menu through a simple user interface (UI) that provides the full compliment of options that are provided by a carriers voicemail system. Because the options provided by a carriers voicemail system may be clearly displayed on system display 109 the need to wait for system prompts or to be privy to hidden commands in order to choose a desired option is eliminated. The onscreen button/functions 101 are mapped to the corresponding DTMF (Dual Tone Multi Frequency) signals associated with the keys of a carriers voicemail menu system according to a memory resident translation that is

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specific to a particular carrier. According to one embodiment, when a user selects the multi-carrier voicemail systems onscreen button/functions, the corresponding DTMF signals associated with a specified carriers voicemail options (e.g., customized signal) may be triggered for the specified carrier.

5 To trigger the selected voicemail function, the user can touch the on-screen button 101 or may press the corresponding key on keypad 105 based on the screen location of the buttons 101. For instance, in Figure 1, "save" is key 1, "erase" is key 2, and "callback" is key 6, etc.

10 Although any memory may be used, according to one embodiment, the above discussed mapping may be facilitated by a SIMM (Single In Line Memory Module) integrated circuit chip (not shown) that may be associated with the multi carrier voicemail system 100A (e.g., locally resident). The SIMM integrated circuit chip may be removable and stores in a translation data related to the voicemail  
15 system configuration featured by each carrier. When onscreen button/functions are selected the SIMM chip is accessed for data related to the specified carriers voicemail system option scheme. The information that is accessed facilitates the translation of locally generated signals (generated from a selection of onscreen button/functions) into signals configured to activate common voicemail functions  
20 of the specified carrier (e.g., custom signals containing the DTMF of the specified carrier that corresponds to a selected option). The memory may store one translation for the carrier used by the user, or may store a plurality of translations for a plurality of potential carriers.

25 It should be appreciated that the voicemail configurations stored in the SIMM chip may be wirelessly updated (have their configuration changed). In addition, the utilization of the SIMM chip facilitates the deactivation of voicemail

navigation prompting schemes. Moreover, unique key combinations featured by respective carriers may be accommodated. Although a SIMM is discussed, any removable memory type may be used.

5           The device of Figure 1 contains a screen having a configurable size because it allows the screen to collapse in order to decrease the size of the device. When expanded, nine common voicemail functions are displayed 101, and these correspond to keys 1-9 of the keypad. However, when closed, only the most commonly used three buttons are shown, e.g., "save", "erase", and "skip".  
10       These correspond to keys 1, 2, and 3 on the keypad. This feature allows for significant use of the voicemail functions even with a screen of limited size as shown in configuration 100B.

          Figure 2 shows a memory resident generator/decoder application 200  
15       according to one embodiment of the present invention. Figure 2 shows a voicemail control system menu 201 with a common plurality of voicemail functions, carrier 1 menu 203, and carrier 2 menu 205. These menus 203 and 205 are memory stored translations that associate particular DTMF signals with the common plurality of voicemail functions 201.

20           According to one embodiment of the present invention, generator/decoder application 200 translates locally generated signals into custom signals configured to activate common voicemail functions provided by the voicemail system of a selected carrier. The generated signals are generated in response to  
25       the selection of a text-key button/function (e.g., 101) that represents a common function provided by a selected carriers voicemail system.

Voicemail control system menu 201 contains an expanded list of the voicemail functions that may be provided by a carriers voicemail system. Each carrier may provide a voicemail system having a menu tree that can be navigated via typical prompt and select operations. According to one embodiment, the text-key button/functions provided in the voicemail control system menu 201 may be employed in the selection of options featured in the menu tree provided by the specified carriers voicemail system.

Carrier menus (e.g., 203, 205) or translations show respective menu configurations provided by respective carriers. Each carrier may provide a voicemail menu having a menu configuration that is unique among carriers. According to one embodiment, the decoder application 200 translates a signal corresponding to a text-key button/function of the multi-carrier voicemail control system (e.g., 100A) into a custom signal configured to control a voicemail function provided by the voicemail system of a specific carrier listed in the carrier menu.

Figure 3 is a flow diagram 300 of processes a multi-carrier text-key customization system for controlling the voicemail systems of a plurality of carriers according to one embodiment of the present invention. Figure 3 shows user interface 310, carriers voicemail system 320, user interface 330, generator/decoder 200 and multi-carrier voicemail control system (e.g., text-key customization system) 100A.

Initially, a user interface (UI) 310 may be employed to alert system users that voicemail messages have been received. According to one embodiment, the user interface may additionally accommodate the selection of such options as

“text messages”, “media messages” and “speed dial” (see user interface 310). Moreover, the user interface may in addition indicate the number of voicemail messages that have been received and the identity of the specified telephone services carrier (see user interface 310 indicating that 10 messages have been received) that is involved.

After being alerted to the presence of voicemail messages, the user may access a specified carriers voicemail system 320, e.g., over a wireless telephone system. Once the carriers voicemail system 320 is accessed an expanded list of the specified carriers voicemail options may appear on the screen 109 of the multi-carrier voicemail control system 100A allowing the user to view the available voicemail options. Onscreen text-key button/functions (e.g., 101) represent the common voicemail options that are provided by the voicemail system of the carrier that is shown in the specified carrier display (e.g., 103).

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After viewing the expanded list of options, the user may select a desired voicemail option. According to one embodiment, the onscreen text-key button/functions (e.g., 101) of the multi-carrier voicemail control system 100A that correspond to a specified carriers voicemail options facilitate local control of functions of the specified carriers voicemail system (e.g., 101). The onscreen button/functions are mapped to the corresponding DTMF associated with the keys of a carriers voicemail menu system by a selected translation of the generator/decoder application (e.g., 200).

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Once a desired option has been selected by a system user the system executes the selected voicemail function. According to one embodiment, when a user selects the multi-carrier voicemail systems onscreen button/functions the

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corresponding DTMF would play for the specified carrier triggering an execution of the selected option. According to one embodiment, once the option has been executed a user interface 330 that indicates the disposition of received messages may be presented to the system user (see user interface 330 of  
5 Figure 3 which indicates that 9 new messages have been received and 1 has been saved).

Figure 4 shows a flowchart 400 of the steps performed in processes of the present invention which, in one embodiment, are carried out by processors and  
10 electrical components under the control of computer readable and computer executable instructions. The computer readable and computer executable instructions reside, for example, in data storage such as memory units 504 and 506 (see Figure 5). However, the computer readable and computer executable instructions may reside in other types of computer readable medium. Although  
15 specific steps are disclosed in the flowcharts, such steps are exemplary. That is, the present invention is well suited to performing various other steps or variations of the steps recited in the flowcharts. Within the present embodiment, it should be appreciated that the steps of the flowcharts may be performed by software, by hardware or by a combination of both.

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Figure 4 shows steps in a process for controlling a remote voicemail system that involves text-key customization according to one embodiment of the present invention. According to one embodiment, the multi-carrier voicemail control system facilitates the translation of locally generated signals into custom

signals configured to activate common voicemail functions of the voicemail systems of a plurality of telephone service carriers.

At step 401, a particular translation among a plurality of translations for a particular remote voicemail system is selected. According to one embodiment, a translation may be selected by choosing one of a plurality of displayed on-screen icons that represent a common plurality of voicemail functions wherein each of the on-screen icons display respective text that correspond to one of a common plurality of voicemail functions.

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At step 403, a custom signal is obtained from the particular translation that is selected in step 401. According to one embodiment, the custom signal corresponds to a common function (common voicemail function) of a specified carriers voicemail system. And, at step 405, a custom signal is issued to a particular remote system (e.g., a specified carrier).

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#### EXEMPLARY HARDWARE IN ACCORDANCE WITH EMBODIMENTS OF THE PRESENT INVENTION

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Figure 5 is a block diagram of an exemplary computer system 500 in accordance with embodiments of the present invention. It should be appreciated that system 500 is not strictly limited to be a computer system. As such, system 500 may be well suited to be any type of computing device (e.g., server computer, embedded computing device, etc.). Within the following discussions



herein, certain processes and steps are discussed that are realized, in some embodiments, as a series of instructions (e.g., software program) that reside within computer readable memory units of computer system 500 and executed by a processor(s) of system 500. When executed, the instructions cause  
5 computer 500 to perform specific actions and exhibit specific behavior which is described in detail below. According to one embodiment, the instructions may include code that when executed perform the steps executed in a process for issuing commands to a remote carriers voicemail system discussed herein with reference to Figure 4.

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Computer system 500 of Figure 5 comprises an address/data bus 514 for communicating information, one or more central processors 502 coupled with bus 514 for processing information and instructions. Central processor unit 502 may be a microprocessor or any other type of processor. The computer 500 also  
15 includes data storage features such as a computer usable volatile memory unit 504 (e.g., random access memory, static RAM, dynamic RAM, etc.) coupled with bus 514 for storing information and instructions for central processor(s) 502, a computer usable non-volatile memory unit 506 (e.g., read only memory, programmable ROM, flash memory, EPROM, EEPROM, removable SIMM, etc.)  
20 coupled with bus 514 for storing static information and instructions for processor(s) 502. The translations (e.g., 203 and 205) discussed above may be stored in memory 504 and/or 506 as is shown in Figure 5. System 500 also

includes one or more signal generating and receiving devices 508 (e.g., such as the wireless phone system described herein, see Figure 6) coupled with bus 514 for enabling system 500 to interface with other electronic devices. The communication interface(s) 508 of the present embodiment may include wired and/or wireless communication technology, e.g., cellphone chipset. Alternatively, in some embodiments, the communication interface 508 is a serial communication port, but could also alternatively be any of a number of well known communication standards and protocols, e.g., Universal Serial Bus (USB), Ethernet, FireWire (IEEE 1394), parallel, small computer system interface (SCSI), infrared (IR) communication, Bluetooth wireless communication, broadband, and the like.

The system 500 may also include a computer usable mass data storage device 512 such as a magnetic or optical disk and disk drive (e.g., hard drive or floppy diskette) coupled with bus 514 for storing information and instructions. An optional display device 510 may be coupled to bus 514 of system 500 for displaying video and/or graphics. It should be appreciated that optional display device 510 may be a cathode ray tube (CRT), flat panel liquid crystal display (LCD), field emission display (FED), plasma display, or any other display device suitable for displaying video and/or graphic images and alphanumeric characters recognizable to a user.

Figure 6 is a data flow diagram 600 of a system in accordance with an embodiment of the present invention. In this example, the system is incorporated within an intelligent wireless telephone system. For instance, the intelligent wireless phone system (e.g., cell phone) may be integrated with a portable computer system, e.g., a hand held type computer system. Within this system, a memory 506, either RAM or ROM, contains a number of translations 203 and 205. Each translation contains a mapping between common voicemail functions (as depicted within the on-screen buttons 101) and the corresponding DTMF signals that implement those functions by a particular voicemail carrier or system 320. A selector 610, selects one of the translations stored in memory 506 as the current or selected translation. The selector 610 may be a memory cell storing an identifier (e.g., offset, address, etc.) of one of the memory stored translations. The memory 506 may be removable and may be subject to wireless modifications by remote systems.

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Display device 109 contains an on-screen listing of common voicemail functions 101. An indication of the selected translation may be communicated to the display 109 in order to display an indication of the selected carrier. The location and position of the on-screen buttons 101 relate to keys on a physical keypad 105. When a user presses a key on the keypad, its indication is communicated to the decoder application 200 which accesses the selected translation. The key press is then translated by the decoder 200 into the custom

DTMF signals required by remote system 320 to implement the selected voicemail function. These custom DTMF signals 620 are then communicated over a wireless link using well known wireless telephone electronics 508.

5           According to this embodiment, the ordering of the common voicemail functions on screen 109 is the same for all translations thereby allowing users to become accustomed to this ordering regardless of the voicemail carrier they elect to use. Furthermore, since the buttons 101 contains labels that indicate the functions to be performed, the user does not need to memorize the particular  
10   keys required by his/her carrier to implement those functions. In this embodiment, the decoder application 200 may be implemented in software in accordance with the computing device shown in Figure 5.

          As noted above with reference to exemplary embodiments thereof, a  
15   computer implemented method of issuing commands to a remote system is disclosed. The method includes maintaining a plurality of translations in a memory, where each translation maintained is for translating between a common plurality of functions and custom signals for implementing the common plurality of functions on a respective remote system. The method further includes  
20   selecting a particular translation from among a plurality of translations for a particular remote system. In addition, the method includes displaying on-screen icons representing the common plurality of functions and responding to a

selected on-screen icon associated with a selected common function. A selected on screen icon is responded to by obtaining a custom signal from a particular translation corresponding to the selected common function and issuing the custom signal to the particular remote system.

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The foregoing descriptions of specific embodiments of the present invention have been presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the invention to the precise forms disclosed, and obviously many modifications and variations are possible in light of the above teaching. The embodiments were chosen and described in order to best explain the principles of the invention and its practical application, to thereby enable others skilled in the art to best utilize the invention and various embodiments with various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the

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15 Claims appended hereto and their equivalents.